

# NASA TECH BRIEF

## *Manned Spacecraft Center*



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### Improved Temperature Control of Liquid Cooling Garments

A new, fluid temperature control system provides better heat removal and increased subject comfort in liquid cooling garments. In this system, four skin temperature readings and an external auditory meatus temperature reading supply the control signal for the temperature control valve.

In present cooling garments, a manually operated three-position valve regulates the temperature of the inlet water. Attempts at automatic operation involve oxygen consumption and pulse rates as indicators for the required cooling. Tests of these systems, however, reveal a need for improved cooling control. Their dependence upon measurements which are not directly related to cooling requirements limits the operational reliability.

The new system responds to directly measured physiological cooling needs and thus is more successful in maintaining the subject at a comfortable temperature, despite changing heat generation rates.

The temperature of the wall of the external auditory meatus and four, averaged, unweighted skin temperatures produce the input signals that control the inlet water temperature valve. The change in mean body temperature and its derivative determine the system response.

The cooling garment is useful in controlling the body temperature of persons under intensive medical care or suffering from disease characterized by high fevers. This new temperature control system is an important

innovation for the manufacturers of thermal protection garments, to hospitals, and to those in medical research.

#### Note:

The following documentation may be obtained from:  
National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)  
Reference: B72-10281

Reference: NASA CR-115122 (N71-34077),  
Control of a Liquid Garment for Extravehicular  
Astronauts by Cutaneous and External Auditory  
Meatus Temperatures.

#### Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to the General Electric Company, Valley Forge Space Division, P.O. Box 8555, Philadelphia, Pa. 19101

Source: Clay W. G. Flucher of  
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